

WE CLAIM:

1. A method of metering the packet rate of a packet flow, comprising the steps of:
 - a) configuring a packet rate limit for an ACL (access control list) interface, defined by a maximum number of packets P_{max} acceptable in a time interval $T_{refresh}$;
 - b) counting the number of packets P received at said ACL interface; and
 - c) discarding all packets arriving at said ACL after P_{max} has been reached.
2. The method of claim 1, wherein P_{max} and $T_{refresh}$ are configurable.
3. The method of claim 1, wherein step b) comprises:
providing a packet rate limit counter at said ACL interface and initiating said counter at a value *StartCount* ;
incrementing the counter with each received packet of said packet flow to provide a *CurrentCount*; and
resetting said counter at said time intervals $T_{refresh}$.
4. The method of claim 3, wherein step c) comprises discarding all packets arriving at said ACL interface after said counter reached a saturation value *CountSat*.
5. The method of claim 3, wherein step c) comprises:
discarding all packets arriving at said counter after said counter reached a saturation value *CountSat*; and
counting the number of the packets discarded since said counter reaches said saturation value until said $T_{refresh}$.
6. The method of claim 5, wherein counting of the discarded packets is performed with said counter.

7. The method of claim 1, further comprising placing the discarded packets in an extraction queue for further examination.

8. For an access control list (ACL) unit provided at a router controlling which IP packets of a packet flow are allowed to enter an IP network based on a plurality of rules, a rate limiting ACL rule comprising:

operating said interface according to an "accept and discard" action, when each packet is accepted or discarded based on a packet rate limit;

operating said interface according to an "accept with extract" action when each packet is accepted or extracted based on said packet rate limit; and

placing each extracted packet in an extraction queue for further examination.

9. The method of claim 8, wherein said packet rate limit is defined as the maximum number of packets P_{max} acceptable in a time interval $T_{refresh}$.

10. The method of claim 9, wherein said rate limiting rule further comprises operating said interface according to a "deny and discard" action, when each packet received at said counter during said time interval $T_{refresh}$, and which is in excess of said P_{max} , is denied access and discarded.

11. The method of claim 9, wherein said rate limiting rule further comprises operating said interface according to a "deny and extract" action, when each packet received at said counter in excess of said P_{max} during said time interval $T_{refresh}$, is denied access to said IP network and extracted for further examination.

12. The method of claim 9, wherein said "accept and discard" action comprises:

initiating a packet rate limiting counter to a *CountStart* value;

counting each packet with said counter to provide a *CurrentCount* value indicative of the number of packets received over said interface until saturation *CountSat* of said counter is reached;

allowing each said packet that has said *CurrentCount* less than said *CountSat* within said time interval $T_{refresh}$; and

discarding each said packet arrived at said counter after saturation of said counter and before the beginning of a next time interval $T_{refresh}$.

13. A line card for a router connected to an IP network, comprising, for each interface on said line card:

a packet forwarding ASIC with an access control list (ACL) unit provided for controlling which IP packets are allowed to enter or exit an IP network based on a plurality of rules,

a packet rate limit counter in said ACL unit for measuring the packet rate of a packet flow; and

a housekeeping processor for operating said counter to implement an access control rate limiting rule for said packet flow.

14. The line card of claim 13, wherein said counter comprises a packet counter field for counting each packet received in said packet flow, and a state register field for determining the action to be performed on said packet.

15. The line card of claim 13, wherein said counter comprises a 13-bit packet counter field for counting each packet received in said packet flow, and a 3-bit state register field for determining the action to be performed on said packet, wherein said state register occupies the most significant bits of each said counter.

16. The line card of claim 13, wherein said housekeeping processor comprises means for resetting said packet counter field at a preset interval of time $T_{refresh}$.

17. The line card of claim 13, wherein said housekeeping processor comprises means for presetting said packet counter field at a start value *StartCount* each given interval of time $T_{refresh}$.

18. The line card of claim 13, wherein said housekeeping processor comprises means for setting said state register field to an action value that determines the operation state of said ACL unit.

19. The line card of claim 18, wherein said housekeeping processor sets said action value to indicates one of an "accept and discard" and an "accept with extract" action, when said packet counter field counts each incoming packet until saturation of said counter.

20. The line card of claim 19, wherein said ACL unit sets said action value to indicates one of an "discard" and an "extract" action, when said counter field is saturated, while said ACL unit denies access to each said packet.

21. In an ACL unit provided at a router for controlling which IP packets are allowed to enter/exit an IP network based on a plurality of rules, a counter for measuring the packet rate of a packet flow, comprising:

- a packet counter field for counting each packet in said packet flow; and
- a state register field for determining the action to be performed on each said packet.

22. The counter of claim 21, wherein said state register field occupies the 3-most significant bits of said counter and said packet counter field occupies the reminder of 13 bits.